

Concord Middle School Solar & Storage Project

Public Forum February 28, 2023



CONCORD MUNICIPAL
LIGHT PLANT
ELECTRIC | BROADBAND | ENERGY MANAGEMENT

We're here to serve you

Agenda

- Town goals
- CMS solar plus storage project scope
- Who will own the Project?
- Visual rendering
- Capital cost
- Quantifiable costs and benefits
- Summary Financials
- Comparables
- No resiliency benefit
- Non-quantifiable benefits

Town Goals

- It has long been a goal of the Town to increase the amount of electricity procured from renewable sources
 - Specifically, from Concord-sited solar systems as secondary or complementary uses, including over parking areas and other passive infrastructure.
 - Indicators of Success
 - Total MW capacity of solar generation on town property
 - Today 7.57 MW / Goal 20 MW
 - Total MWh capacity of battery storage on town property
 - Today 0.0 MWh / Goal 60 MWh
- Prior Articles, plans and committees
 - 2022 Town Meeting Article 38 - Development Plan for Municipal Solar Generation
 - 2020 Climate Action and Resilience Plan
 - 2018 Final Envision Concord Plan 2030
 - 2017 Town Meeting article 51 Concord's Energy Goals
 - 2015 Town Meeting Article 36 authorize long-term lease for municipal building rooftop and ground mounted solar panels
 - 2011 Solar Siting Committee; Concord Municipal Light Plant Renewable Energy Strategy

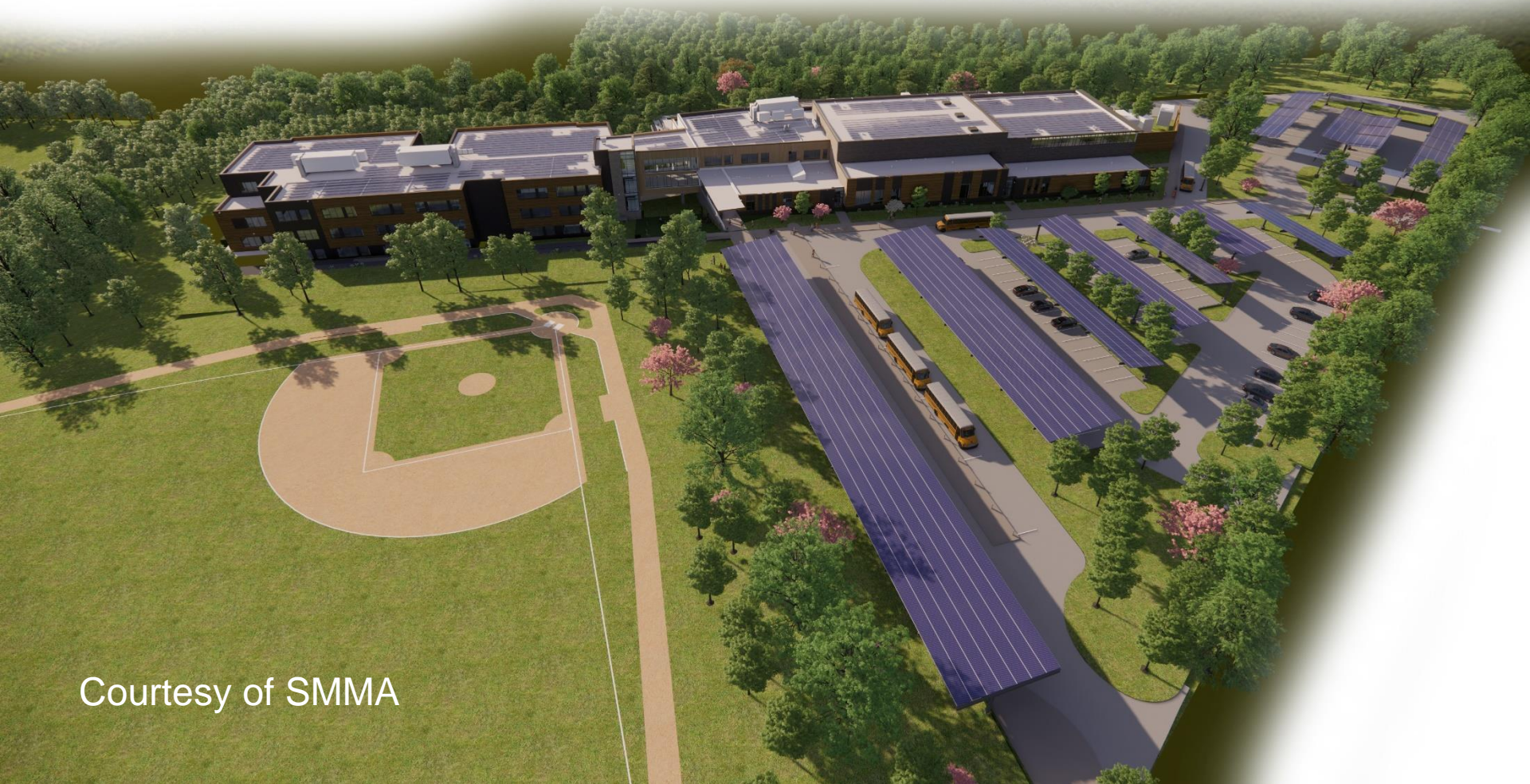
MS Project Scope

- Solar arrays covering the CMS roof and parking canopies PLUS a storage system
- The electrical output from the arrays is expected to exceed what CMS will use each year – it will be NET ZERO
- A storage system is needed in order for the Light Plant to absorb that much new solar on the distribution system

Who will Own the Project?

- CMLP has been working under the assumption of managing this project since late 2021 when the warrant article for the school building project was published
 - CMS fulfills its net-zero requirement
 - CMLP progresses towards its in-Town solar generation goal
 - CMLP rate payers will fund the project.
 - It is estimated that the monthly bill impact to CMLP residential customers will be between \$0.50 and \$1.70 in year 1 then decrease to a net savings by 2029 or 2035.

Visual Rendering



Courtesy of SMMA



CONCORD MUNICIPAL
LIGHT PLANT
ELECTRIC | BROADBAND | ENERGY MANAGEMENT

We're here to serve you

Visual Rendering



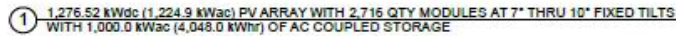
Courtesy of SMMA



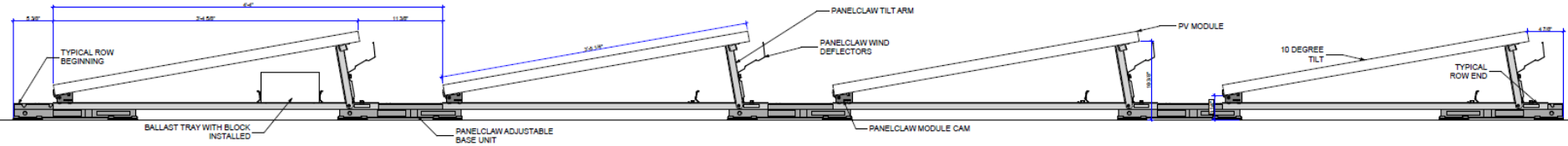
**CONCORD MUNICIPAL
LIGHT PLANT**
ELECTRIC | BROADBAND | ENERGY MANAGEMENT

We're here to serve you

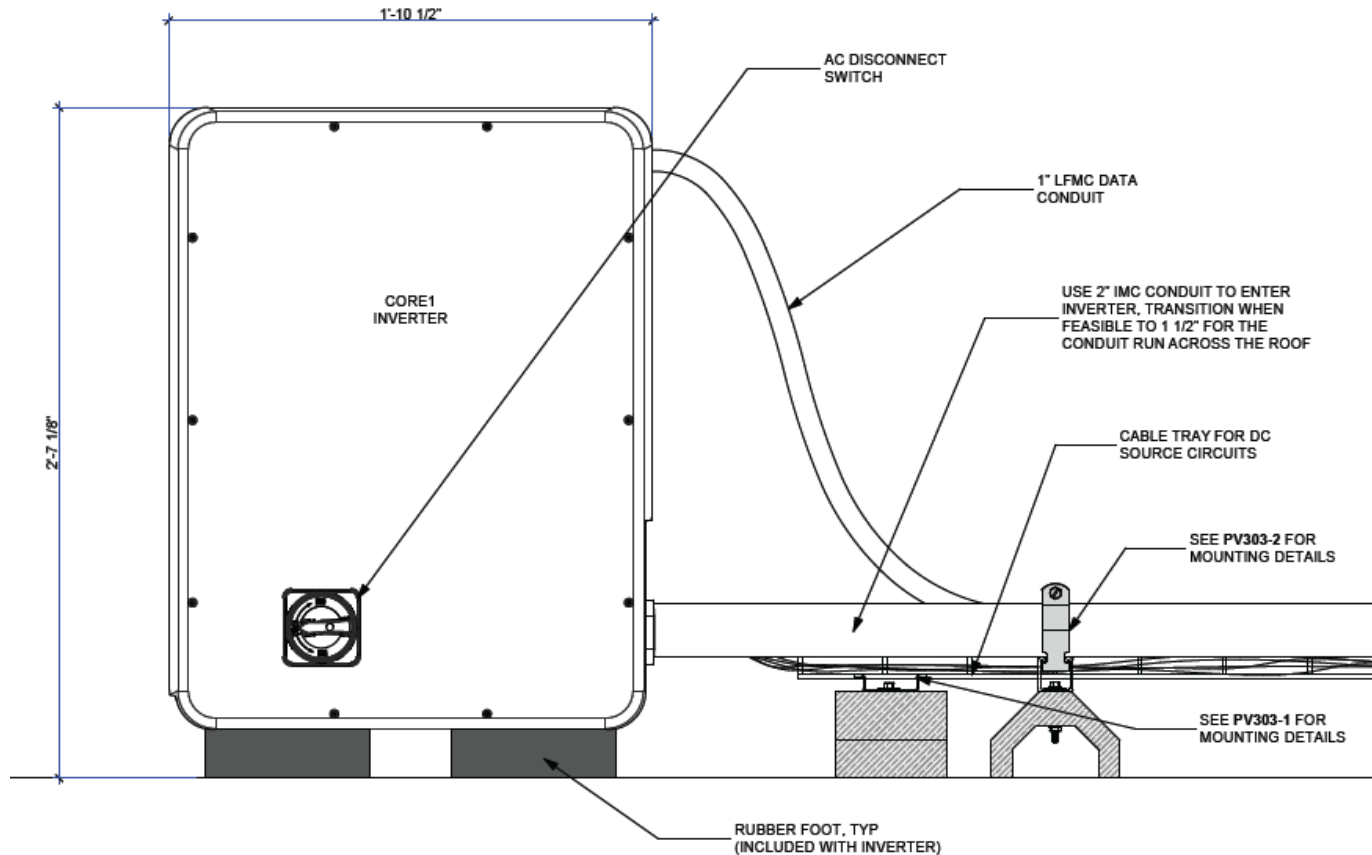
Middle School Photovoltaic System



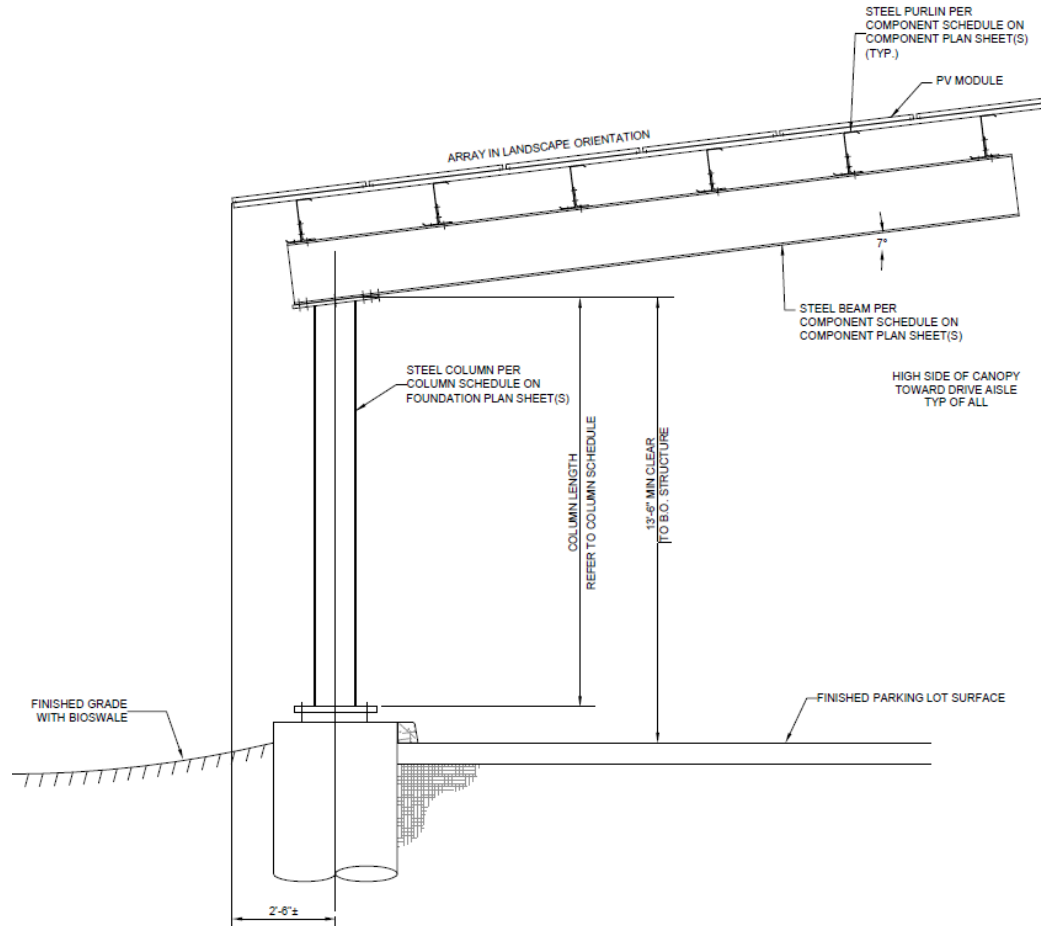
Rooftop Module Racking



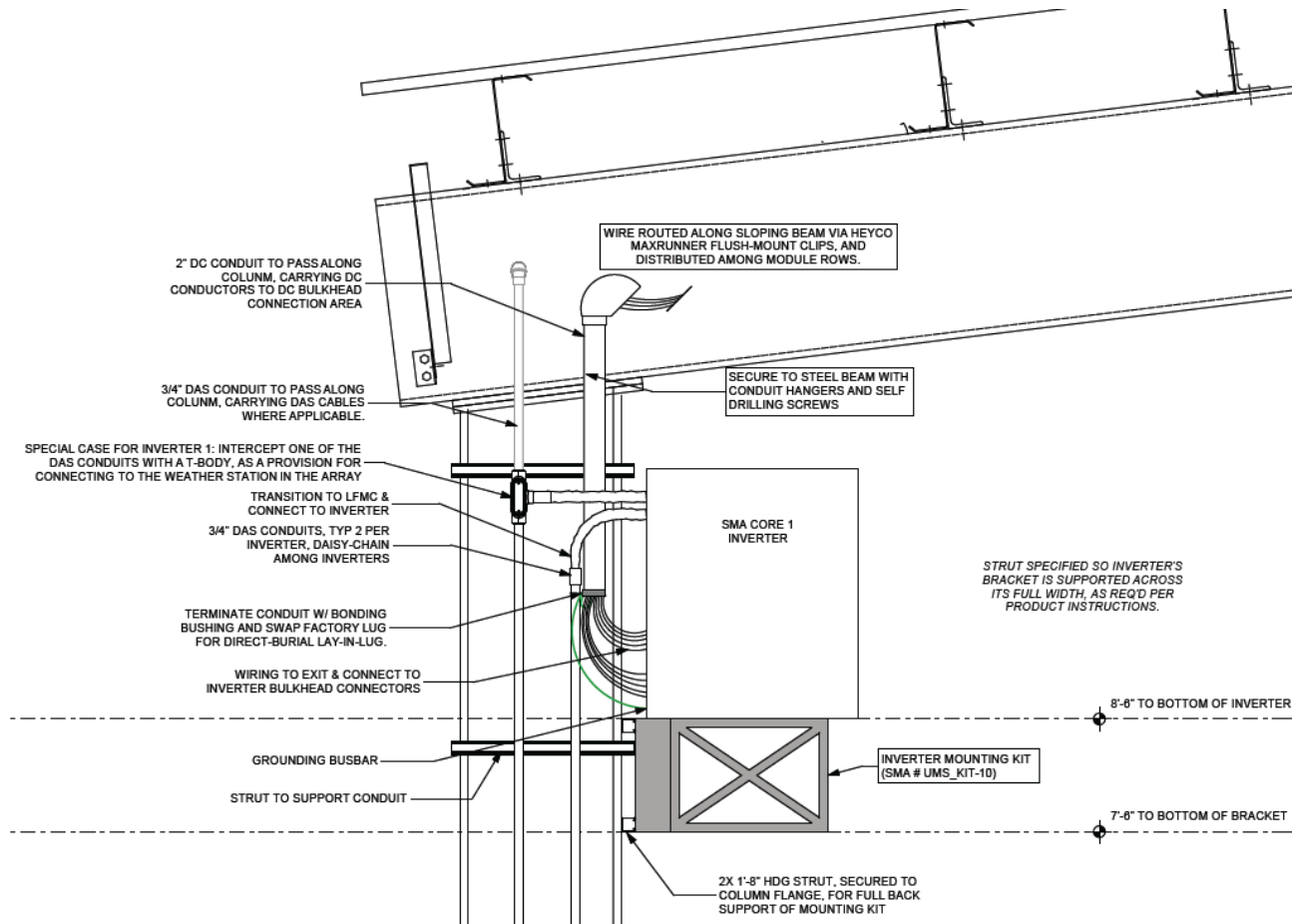
Rooftop Inverter



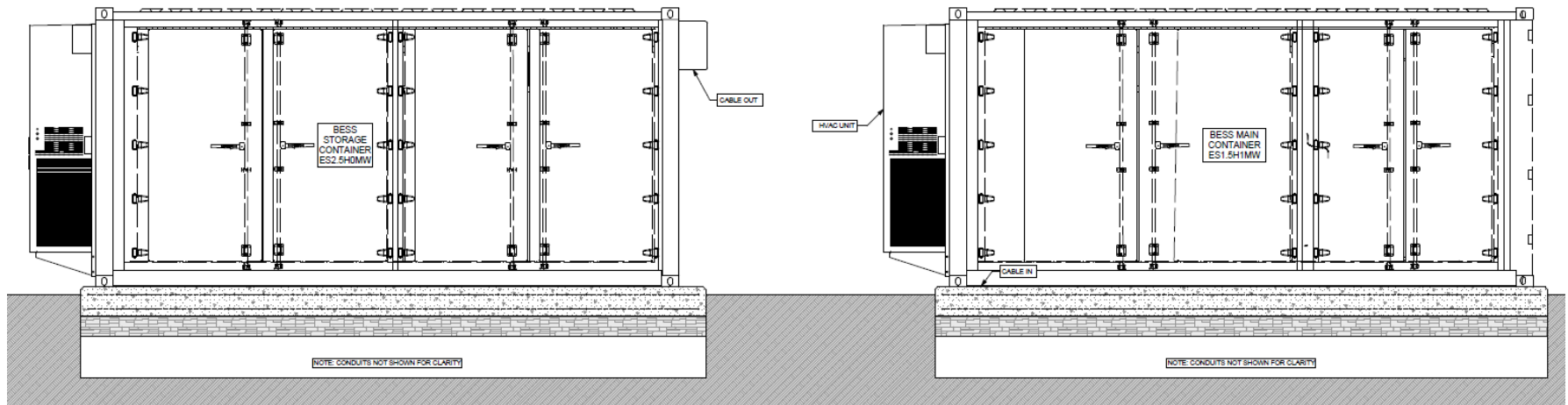
Canopy Mounting



Canopy Inverter



Energy Storage Example



**CONCORD MUNICIPAL
LIGHT PLANT**
ELECTRIC | BROADBAND | ENERGY MANAGEMENT

We're here to serve you

Energy Storage Example



Capital Cost

- The \$13MM cost estimate in the Warrant article has been revised downward after the battery size was changed from 8MWh to 4MWh.
- The revised pricing, based on estimates provided by Solar Design Associates, CMLP's solar consultant, is between **\$6 and \$7.5MM**. This pricing is based on industry comparables and trends and is not based on actual vendor quotes.
- There is a wide variation in the capital cost because there may be an opportunity to receive grant funding.
 - The \$6MM cost estimate assumes the grants will apply.
 - The \$7.5MM cost estimate assumes no grant offset.
- CMLP expects to revise Article 21 to \$7.5MM with a handout.

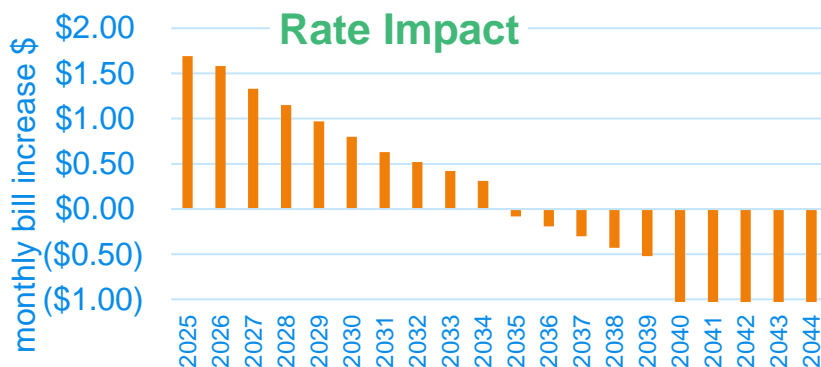
Quantifiable Costs and Benefits

- The project produces benefits
 - Non-carbon emitting electricity production
 - Peak cost mitigation
 - Energy arbitrage from the battery
- Costs include capital and annual maintenance
- The Summary Financials below subtract the benefits from the costs to derive a net present value of the annual resulting cash flow

Summary Financials

Without IRA Credit

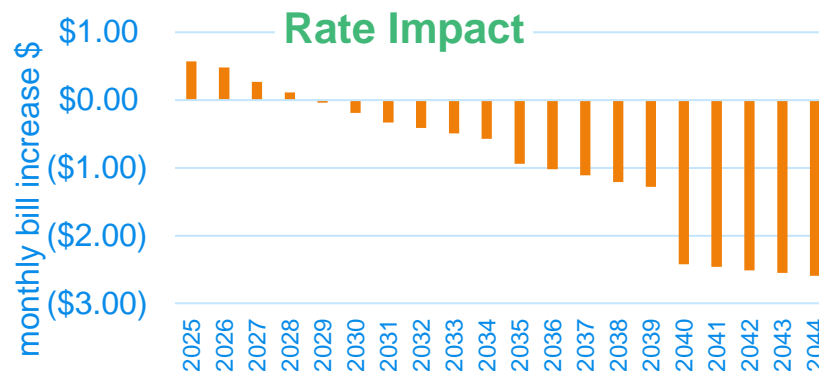
X 1,000	Capital Cost	20-year NPV
Solar	4,614	(2,375)
Battery	3,339	1,802
Total	7,953	(573)



Average customer 869 kWh/mo.

With IRA + ARPA Credits

X 1,000	Capital Cost	20-year NPV
Solar	3,604	(864)
Battery	2,668	2,473
Total	6,272	1,609



Average customer 869 kWh/mo.



**CONCORD MUNICIPAL
LIGHT PLANT**
ELECTRIC | BROADBAND | ENERGY MANAGEMENT

We're here to serve you

No Resiliency Benefit

- CMLP will operate the battery to absorb the solar production and to offset costs
- In general, the battery will be
 - emptied by 10:00-11:00 a.m.
 - charged between 10:00 a.m. and 3:00 p.m.
 - discharged between 4:00 p.m. and 8:00 p.m.
 - It may be charged again between 1:00 a.m. and 4:00 a.m.
 - discharged again between 6:00 a.m. and 9:00 a.m.
- Final design may or may not allow the battery to supply the school during an outage.
- If the school experiences an electric outage at 10:00 a.m., there will be nothing in storage to draw from.

Non-quantifiable Benefits

- Environmental justice
 - By locating the project in Concord, we are not asking another community to shoulder the burden
- Educational Experience
 - Gets students interested in renewable energy, potential to involve in curriculum
- Parking canopy protection

APPENDIX



CONCORD MUNICIPAL
LIGHT PLANT
ELECTRIC | BROADBAND | ENERGY MANAGEMENT

We're here to serve you

UMass Amherst Canopy



River Valley Co-op Solar







SOLAR POWER



LOT F
PARKING FOR
FACULTY